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BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of)

Advanced Television Systems and)
Their Impact upon the Existing)
Television Broadcast Service)

MM Docket No. 87-268

To: The Commission

PETITION FOR PARTIAL RECONSIDERATION

The National Radio Astronomy Observatory (NRAO), Socorro, New Mexico, by and through its attorneys, hereby requests partial reconsideration of the *Sixth Report and Order* in the above-captioned proceeding. NRAO requests the substitution of another channel in lieu of the allotment of Channel 38 to Fajardo, Puerto Rico. In support, the following is shown:

1. Among other facilities, NRAO operates a Very Long Baseline Array (VLBA) consisting of ten automated 25-meter radio telescope antennas at ten sites across the United States and its territories, from Mauna Kea, Hawaii to St. Croix, Virgin Islands. Data from each receiver are combined in a specially designed digital computer system allowing the synthesis of a single radio telescope 8000 kilometers (5000 miles) in diameter, the largest dedicated telescope in the world. An additional facility at west central New Mexico, the Very Large Array (VLA), consists of twenty-seven automated 25-meter radio telescope antennas. Like the VLBA, data are combined to allow synthesis of a single radio telescope. In Comments filed by NRAO in response to the Commission's *Sixth Further Notice of Proposed Rule Making*, NRAO urged the Commission to modify several proposed DTV allotments because the potential degradation which would be caused to NRAO's telescopes.

2. In its Comments, NRAO urged the Commission to delete the proposed DTV allotment of Channel 38 to the Channel 8 (WVSI) facility in Christiansted, VI on the grounds that adjacent channel emissions would virtually eliminate radio astronomy

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observations in the 608-614 MHz radio astronomy band (Channel 37) at the VLBA antenna located on St. Croix and that any location on that island would be line-of-site to the VLBA antenna there. The *Sixth Report and Order* did modify that DTV allotment to substitute Channel 20 for Channel 38 there. Unfortunately, the *Sixth Report and Order* also proposed the allotment of DTV Channel 38 to be paired with Channel 40 in Fajardo, Puerto Rico. NRAO's analysis of radio propagation conditions from the antenna site identified on page B-62 of Appendix B to the *Sixth Report and Order* (18-18-36 NL, 065-47-41 WL) to the VLBA antenna in St. Croix established that line-of-site propagation exists there as well. Moreover, NRAO's technical analysis also shows that a significant potential exists for NRAO's St. Croix antenna to receive RFI from any Channel 36 or Channel 38 antenna sites located virtually anywhere on the Virgin Islands or located in the eastern half of Puerto Rico.¹

3. NRAO's analysis used the Harmful Power Flux Density figure from the ITU Recommendation ITU-R.769 (1994), Protection Criteria Used for Radioastronomical Measurements and the technical data from Appendices A and B from the *Sixth Report and Order*. The distance from the Fajardo Channel 38 site and the VLBA St. Croix antenna is 142 km (88 miles) without any intervening obstacles. NRAO also used the Longley-Rice propagation model to calculate the direct path (radiation) loss as well as an estimate of diffraction losses where applicable. Assuming that the DTV Channel 38 facility would use a 0 DBi gain antenna at the limited maximum power output of 50.1 kW, the power flux densities would exceed the Harmful Effective Radiated Power Density figures for the St. Croix VLBA antenna by 104 dB in the adjacent Channel 38 band. This level of interference would require extraordinary measures by the licensee to suppress spurious emissions in Channel 37.

4. NRAO urges the Commission to avoid any allotment of Channels 36 and 38 for DTV service to the Virgin Islands and Puerto Rico because of the significant harmful interference which would be caused to NRAO's VLBA antenna in St. Croix. In the event that the Commission does not adopt Cornell's proposal to allot Channels 15 or 16, which proposal NRAO supports, then NRAO urges the Commission to avoid the following DTV allotments in Fajardo which cause second or third harmonics to fall within allotted

¹ NRAO's studies also showed that the Arecibo radio telescope located near the north-central coast of Puerto Rico is only partially shielded by terrain from the proposed Channel 38 Fajardo allotment and that there exists a significant potential for disruption of radio astronomy observations on Channel 37 from a Channel 38 facility in Fajardo. NRAO notes that Cornell University, which manages and operates the Arecibo Radio Astronomy Observatory, has proposed the allotment of Channels 15 or 16 in Fajardo instead of Channel 38 in its Petition for Partial Reconsideration. NRAO supports Cornell in this regard.


or footnoted radio astronomy frequency bands: Channels 11, 14, 25, 27, 28, 31, 36, 38, 46, 47, 48, 49, 50, 51, 52, 53, 54, and 69.

For the foregoing reasons, NRAO believes that the Channel 38 DTV allotment to Fajardo, Puerto Rico will cause significant harm to radio astronomy research conducted in conjunction with the VLBA facility in St. Croix and requests that the Commission delete that allotment and substitute an allotment which will not interfere with NRAO's facilities.

Respectfully submitted,

NATIONAL RADIO
ASTRONOMY OBSERVATORY

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